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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/995,302	11/27/2001	Robert H. Kraus JR.	Robert H. Kraus. Jr.	9000
35068	7590	12/22/2003	EXAMINER	
UNIVERSITY OF CALIFORNIA LOS ALAMOS NATIONAL LABORATORY P.O. BOX 1663, MS A187 LOS ALAMOS, NM 87545			DO, PENSEE T	
			ART UNIT	PAPER NUMBER
			1641	3

DATE MAILED: 12/22/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/995,302

Applicant(s)

KRAUS ET AL.

Examiner

Pensee T. Do

Art Unit

1641

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 December 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-42 is/are pending in the application.
- 4a) Of the above claim(s) 15-42 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-14 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-42 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-14, drawn to a particle identification apparatus comprising a flow cell and a magnetic field sensor, classified in class 324, subclass 326.
- II. Claims 15-18, drawn to a particle sorting apparatus, classified in class 422, subclass 50.
- III. Claims 19-42, drawn to a kit comprising a population of magnetic microspheres each attached to a receptor agent and a population of non-magnetic microspheres each attached to a receptor agent, classified in class 436, subclass 526.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions the apparatus for identifying particles cannot be used together with the particle sorting apparatus because they have different modes of operation, different functions and different effects.

Inventions I & II and II are unrelated. Inventions are unrelated if it can be shown that they are not disclosed as capable of use together and they have different modes of operation, different functions, or different effects (MPEP § 806.04, MPEP § 808.01). In the instant case the different inventions the apparatuses are not capable of being used

together with the kit. The particles can be used for other purposes such as for separation or immobilizing target analytes in an assay.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art as shown by their different classification, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and the search required for Group I is not required for Group II or III, restriction for examination purposes as indicated is proper.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

During a telephone conversation with Mr. Bruce Cottrell on December 10, 2003 a provisional election was made with traverse to prosecute the invention of I, claims 1-14. Affirmation of this election must be made by applicant in replying to this Office action. Claims 15-42 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

A detailed action for claims 1-14 is as follows:

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 3, 5, 6, 7-9, 10, 11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 is unclear as where the magnetic field sensor is in spatial relation to the flow cell and the magnetic detection system in claim 1. "said fluid stream" in line 3 lacks antecedent basis. The "stream" in claim 1 has not been defined as a "fluid stream".

Claim 5 is confusing for reciting "means of magnetizing...labeled microspheres prior to passage of said labeled microspheres by an ***aligning means*** and a ***means of aligning*** said labeled microspheres within said fluid stream". What is the difference between the two aligning means emphasized?

Claims 6 & 7 recites an abbreviation "SQUID". The abbreviation needs to be spelled out for abbreviations may have more than one meaning.

Claim 12, please change "a detectable" in line 2 to --the detectable-- for proper antecedent support.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3, 5, 8-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Baselt (US 5,981,297).

Baselt teaches an apparatus comprising a small desktop unit into which the user injects liquid sample. Within the unit is a disposable, but multiuse, liquid flow cell through which the sample flows. The cell contains a detector which is microfabricated device bearing magnetoresistive elements. The detector is a magnetic field detector which has one or more magnetic field sensors. The sample and one or more magnetizable label particles are brought into contact with the detector at the same or at different times. These label particles have attached binding molecules that specifically bind to either the target species, the sensor-bound binding molecules or both. The unbound label particles are removed and the remaining bound label particles are magnetized. The apparatus also comprises a magnetic field generator (means for aligning the magnetic label particles) which creates a magnetic field that magnetizes the particles. (see col. 7, lines 22-25). The magnetic field generator produces a magnetic field oriented perpendicular to the magnetoresistive element in the magnetic field detector. The magnetoresistive element will not detect such a field, but it will detect the field generated by the particles in response. (see col. 7, line 65-col. 8, line 2).

Regarding claim 5, a magnetic field reads on such means for magnetizing said

population of magnetizable particles. Since the present invention is drawn to an apparatus, functional limitations such as magnetizing the particles prior passing them through the flow cell are not given any patently weight.

Claims 1-3, 5-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Simmonds et al. (US 6,597,176).

Simmonds teaches an apparatus for quantitatively determining amounts and identities of substances within patterns of magnetic particles, such as within lateral flow membranes, microfluidic systems and the like. The apparatus comprises a sample holder including an inlet for introducing the analyte particles; a lateral flow membrane through which the analyte particles may flow, the lateral membrane has a predetermined area containing a plurality of magnetic particles wherein the analyte particles may become bound to the magnetic particles; a magnetic field source to apply an alternating magnetic field to the samples (aligning means, magnetizing means); a magnetic field sensor having output signal conductors to communicate output signals; and an electronic signal processor to convert the output signals from the sensor to provide a signal indicative of the quantity of the samples in the predetermined area. Other magnetic field sensors are SQUID sensors. There may be more than one sensor. (see col. 11, lines 41-45; claim 1). The detectable property of the magnetic particles is the magnetic moments (see col. 1, lines 23-25).

Claims 1, 3, 5-12 are rejected under 35 U.S.C. 102(b) as being anticipated by Imai et al.(US 4,913,883).

Imai teaches an apparatus for measuring in a magnetic manner the agglutination condition of magnetic particles using a magnetometer. The apparatus comprises a flow cell such as a flow cytometer and a detection unit comprising a magnet and a SQUID for measuring magnetic moment of magnetic particles. (see col. 1, lines 60-68; col. 2, lines 66-col. 3, line 2).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Simmonds et al. (US 6,437,563) in view of Wilson (US 6,337,215).

Simmonds has been discussed above.

However, Simmonds fails to teach a means of sorting each labeled magnetic microsphere after measurement of magnetic moment on each microsphere into collection of particles of similar magnetic moment.

Wilson teaches a paramagnetic particles sorter which sorts magnetic particles of different magnetic moments into collection of particles of similar magnetic particles. A particle moves through a dispersion region of a sorter and experiences a horizontal field and a gradient field. Dispersion region deflects the particle in a direction proportional to the strength of the magnetic moment of particle and the strength of the magnetic field that is applied. Wilson also suggests to devise schemes wherein separations for given

types of markers can be obtained by connecting different sorters as serial logical elements to discriminate for or against single bead types or combinations of bead types. (see col. 13-line 55-col. 14, line 67).

It would have been obvious to one of ordinary skills in the art to use the sorting means taught by Wilson as part of the apparatus taught by Simmonds since both references teach the use of magnetic particles labeled with markers to separate biological molecules in assays. With the use of a sorter, biological molecules-bound magnetic particles with different markers/labels can be separated accordingly to their magnetic moments without further affinity separation and that way many different populations of biological molecules can be separated at one time.

Claims 13, 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Imai et al. (US 4,913,883) in view of Wu et al. (US 6,297,061).

Imai has been discussed above.

However, Imai fails to teach the detectable property is selected from the group consisting of fluorescence, absorbance, reflectance and scattering, and the detection system for measuring the detectable property is a flow cytometer.

Wu teaches an apparatus and method of separating a mixture of sample and detecting separated portion (product stream) possibly containing the target analyte by using a flow cytometer to measure the fluorescence intensity remaining on the beads. The beads can be magnetic, and a magnetic field can be used to pin the beads to allow reaction with the analytes. (see col. 3, line 6-13).

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It would have been obvious to one of ordinary skills in the art to combine the detection method by a flow cytometer as taught in Wu using the apparatus of Imai because since Imai also teaches using a flow cell such as a flow cytometer and Imai also has a magnetic field generator to pin the beads. The flow cytometer of Wu can be used to measure fluorescence of the analytes attached to magnetic the particles. Such measurement is helpful in the identification of particles in a mixture of many different populations. Rather than using the flow cytometer only for flowing the sample as taught in Imai, using the flow cytometer the way taught by Wu is more efficient because the analytes can be conveniently identified after being separated.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Pensee T. Do whose telephone number is 703-308-4398. The examiner can normally be reached on Monday-Friday, 7:00-3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on 703-305-3399. The fax phone number for the organization where this application or proceeding is assigned is 703-308-4242.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0196.


CHRISTOPHER L. CHIN
PRIMARY EXAMINER
GROUP 1800 1641

Pensee T. Do
Patent Examiner
December 11, 2003